



## The Aeronautical Newsletter of the Seattle Flight Standards District Office

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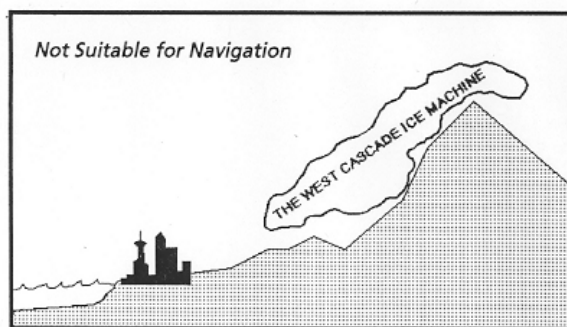
November-December 2003

### THE WEST CASCADES ICE MACHINE

The West Cascades Ice Machine is a weather phenomenon during which air, laden with moisture due to it's recent trip across the Pacific Ocean, blows into Western Washington and is lifted up the western slopes of the Cascade Mountains. This lifting of the moist air has a cooling affect and produces some of the very best (or worst, depending upon your point of view) aircraft icing conditions in the World.

Ice accumulation here can be extremely rapid. It is an icing condition that must be taken into account **in addition to** the normal icing conditions that accompany the usual cold and wet that exists throughout the North West during the winter. In generalized terms, the ice machine exists primarily over the west slopes of the Cascades east to and slightly beyond the crest, and is most prominent between 6 and 14 thousand feet MSL. Pilots of light, general aviation aircraft caught in the Ice Machine can instantaneously find themselves in icing conditions where full power and best rate of climb speed results in rates of **descent** in excess of 500 feet per minute!!! Icing conditions over the Cascades can be so extreme that de-icing equipment on propeller-driven aircraft cannot keep up with the rate of ice accumulation. Not the kind of thing you want to

be experiencing over the Cascades.



If we are going to fly, we must accept some risk. The secret to flying a good long time is to be able to differentiate between reasonable risks and unreasonable risks. Then avoid the unreasonable risks and enjoy many hours aloft.

Structural icing on light, general aviation aircraft is an unreasonable risk. It makes the aircraft heavier, and it disturbs the airflow over wings and propellers, which makes them less efficient. As ice accumulates the aircraft gets heavier, while lift and thrust decrease. In extreme cases, the aircraft becomes so inefficient and so heavy that full power and the use of best rate of climb speed results in significant loss of altitude. There is absolutely nothing good about structural icing.

A couple rules of thumb about accumulating structural ice. First, the aircraft must be flying in an

area of visible moisture (rain, snow, cloud, fog, etc). Second, the critical temperature range is about plus 3 degrees Centigrade to approximately minus 20 degrees Centigrade. Moisture which is warmer than plus 3 is rain which will not stick to the aircraft (except when aircraft which have been flying in sub freezing temperatures for some time, descend and

encounter the rain, creating freezing rain). Moisture which is colder than minus 20 degrees Centigrade is too cold and too dry to adhere to the surface of the aircraft (if you threw ice cubes at your aircraft would they stick)? These are generalizations and of course there are exceptions.

At this point there is one bit of information you need to know. The FAA definition of the phrase "known icing conditions" comes from numerous NTSB law judge decisions on icing-related certificate actions over the years. Beginning with a case in 1957, the NTSB has stated that icing conditions exist when temperatures are near or below freezing and visible moisture is present. They have said further that because the flight service station network states the existence of those conditions in reports and forecasts that are available to pilots both before

flight and while en route, the icing conditions become "known." So, contrary to common belief, it is not necessary to have a pilot report to have known icing conditions.

**It must be stressed that WE ARE NOT ENCOURAGING ANY PILOT OF AN AIRCRAFT THAT IS NOT EQUIPPED FOR FLIGHT IN KNOWN ICING CONDITIONS TO FLY INTO KNOWN ICING CONDITIONS.**

There are two scenarios involving IFR flight over the Cascades where you may wish to depart from normal ATC handling. The first is when departing IFR from Puget Sound airports with destinations to the east. ATC normally assigns an easterly heading and instructs the airplane to "climb and maintain...." They know the shortest distance (and minimum Hobbs time) between two points is a straight line. The problem is that if the Ice Machine is turned on, this procedure will have you climbing up through some of the worst icing conditions in the World!!! If full power and best rate of climb speed result in negative climb performance (a common result), you will be falling directly onto the Cascade Mountains. And survival there is tough in the wintertime!

There is an alternative departure procedure you may want to utilize. In your earliest contacts with ATC, state that you are scared of the ice and request "Radar Vectors for Ice". During your climb ATC will give you radar vectors that will keep you over the greater Puget Sound area until you tell them you are ready to proceed on course. You might be vectored to the north, or to the south, or even west. But you will not be turned east on course until you request it.

If you successfully climb to non-threatening conditions above the Ice Machine you can request to, "Proceed on course" and you are on your way. This climb on "Radar vectors for Ice" will definitely add to your total flight time, but it sure beats descending uncontrolled onto the Cascades.

The second time you may wish to depart from normal ATC handling is when arriving back to a Puget Sound airport on an IFR cross country from the east on Victor 2. Assume that you have been flying in VFR conditions above a solid layer of clouds at say, 10,000 or 12,000 feet MSL and to this point ice accumulation has NOT been a problem. As you approach the crest of the Cascades, ATC instructs you to, "Descend and maintain 8,000". They do this to get you down as much as possible because the light airplanes departing Puget Sound airports and proceeding IFR east bound will be routed over the top of you at or above 9,000.

But descending and maintaining 8,000 just might put you right into the middle of the Ice Machine. Again, you could end up full power, best rate of climb speed, and descending rapidly onto the Cascades. Your option is to explain as soon as possible to ATC that you are scared of the ice potential, and use plain English words to negotiate an alternate plan. Perhaps you would like to, "Maintain current altitude until within 30 miles of the Seattle vor-tac", or some other option of your choice.

When you start this negotiation process, you automatically agree to accept radar vectors. For example, if one of those Puget Sound departures is heading your way and they need your present alti-

tude during their climb out, you will likely be vectored to get well out of the way of the departure. Still, the additional tenth or two is much better than a night in the mountains in the winter.

These procedures have been used successfully by many Washington IFR pilots for years, but now we have an understanding between pilots and controllers and some phraseology to help. Remember that controllers cannot see the flight conditions and will NOT initiate these actions. "I'm scared of the ice" procedures must be requested by the pilots. These procedures impose additional work loads on the controllers so please do not request them unless you need them to. But, if ATC gives you a clearance that you think will lead you into icing conditions, NEGOTIATE! It might be inconvenient for ATC, but it will save Search and Rescue a lot of work.

**Again, WE ARE NOT ENCOURAGING ANY PILOT TO ENTER ICING CONDITIONS THEIR AIRCRAFT IS NOT EQUIPPED TO HANDLE.** If your aircraft is not equipped to handle ice, don't let anyone talk you into flight into known icing conditions, much less the Cascade Ice Machine.

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### **ICING VIDEO**

NASA has produced 2 videos, 1 DVD, and 1 CD on the subject of Icing. The programs provide the very latest findings regarding the formation of ice on aircraft. The programs are wonderful and every IFR pilot should have them in their library. The programs are available for little more than the cost of shipping. Info at:

<http://icebox-esn.grc.nasa.gov>  
Click on "educational videos and computer-based training material".

## PRESIDENTIAL TFR

When President Bush visited Seattle last August, he brought with him a Temporary Flight Restriction with a 30 nautical mile radius!!! The TFR was protected by swift military aircraft, flown by military pilots who take their responsibilities very seriously. Ten local pilots penetrated the Presidential TFR without authorization and will be losing their pilot certificates for 30 days each. The certificates will be automatically returned to the pilots at the end of their sentences, but no one wants to go through that.

What breaks our hearts is that none of the pilots were terrorists, and none meant any harm to the President. They simply looked out the window, saw good VFR weather, and jumped into their airplanes for local VFR flights. Their only mistake was in not calling the Flight Service Station first. General aviation pilots were allowed to fly within the TFR, but **ONLY** if they called the Flight Service Station before the flight and informed the FSS of their route of flight, altitude, and time of the flight. At that point the pilots were assigned a specific, discrete transponder code. By displaying the transponder code, they were allowed to penetrate the TFR.

The message here is anytime you hear of the President or Vice President, or major leaders of foreign countries visiting the area, **do yourself a favor and call the Flight Service Station before flying!!!** It's a new requirement, put into place since September 11, 2001, although we have not yet added it to the written test. Even if you normally never call Flight

Service Station, if you hear the President is coming to town, you've just got to check in with them on that day.

Be aware also, that the President departed Seattle a little later than originally planned. So, literally at the last minute, a new NOTAM was published which extended the original expiration time. This kept the TFR in existence one hour longer than originally published. Ya'll be careful.

Dear Wilbur:

I just received my July issue of Plane Talk. There was a paragraph about flight plans to Canada. It says that U.S. pilots flying into and landing in Canada need a flight plan. FAR 91.707 says flight plans are necessary for flights between Mexico or Canada and the U.S. What about the situation of transiting Canadian airspace without landing in Canada. Like flying from Port Angeles to the San Juan Islands via the shoreline south of Victoria B.C.? Is this example "between" the U.S. and Canada?

Thanks,

Robert (Dungeness, WA)

Robert:

GREAT question Robert. We should have said something in the original story. The flight plan is required **ONLY** if you will be taking off in one country and landing in the other. As long as you are just over flying, and do not land in the other country, a VFR flight plan is **NOT** required. Your example is a great one. Another is the airplane taking off from say Port Angeles, WA and flying non-stop to say Anchorage, Alaska. Again,

no VFR flight plan is required as long as there is no landing in Canada. Still, while not filing the VFR flight plan might meet the minimum standards set forth in the F.A.R., it might not meet your own personal standards of excellence.

Wilbur

## NEW STYLE PILOT CERTIFICATE

The November issue of Plane Talk mentioned that a new style, hard card, pilot (or mechanic) certificate is now available. In that article we failed to mention that you can get one of the new style certificates just because you want one. The \$2 fee still applies, and the address is still FAA – Airman Certification Branch, P.O. Box 25082, Oklahoma City, OK 73125. Just write them a letter and say you would like one of the new certificates. Send a Xerox copy of your existing certificate (or just mention your certificate number and issue date) along with the \$2 fee. Include other information like address update if you wish. It will take about 7 weeks to get the new certificate into your mailbox. Do **NOT** send in your current certificate. You will need it if you decide to fly during the 7 week wait.

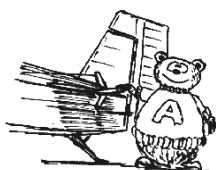
### ADDRESS CHANGE?

The address list is stored in a BIG computer at the Home Office in Oklahoma City. They are the ones to notify of any address changes so we can continue to bring you AeroSafe and other good stuff.

FAA Airman Certification Branch  
Box 25082  
Oklahoma City, OK 73125

# AEROSAFE

May you always find VFR and tailwinds.



A Bearly Able Publication